

Umetco Minerals Corporation

APR 13 1986

INTERNAL
CORRESPONDENCE



PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

xc ✓ J. F. Frost

4/21/86 RKJ

To (Name) Mr D G Millenbruch
Division Umetco Minerals Corporation
Danbury, CT

Date April 15, 1986

Originating Dept. TECHNOLOGY

Location

Area

Area

Answering Letter Date

Copy to Messrs.
--- R G Beverly/R Jones
L G Evans
T J Kagetsu
F. V McMillen
W D Smith

Subject Niagara Plant Radioactive
Material License 950-0139

The purpose of this letter is to bring you up-to-date on four areas within the Niagara Plant that were found to have levels of radioactivity well above background

For your convenience, I am appending my letter of March 25, 1986 to Mr R F Kelly of the New York State Department of Labor which identifies the four areas and outlines a plan for decontamination

Subsequently it became obvious that the magnitude of the task was far greater than originally assumed

In cleaning up the area around No 30 furnace we filled seventeen 55-gallon drums We had Mr. William Smith, Radiation Officer for Linde, and acting radiation officer for the Niagara Plant take samples and check them for alpha and alpha beta gamma radiation in his lab at Tonawanda The activity suggested the cleanup was not complete

The radiation in Building 24 (V-A1) came from a 9'6" x 10' concrete pit that was filled with a black sand that we later identified as primarily illmenite This pit seemed endless, we discontinued the operation after removing one hundred twenty six 55-gallon drums and reaching a depth of 9 feet In addition, the pit was found to extend beneath the floor of the V-A1 operation

The third area, which we assumed was contaminated soil beneath a slag pile turned out to be radiation from the slag itself The amount of radioactive slag is small in comparison to the thousands of tons piled in the yard and fortunately is confined to a small area So far we have not determined just how much slag we are talking about but I suspect it is not more than 100 tons. Even this amount presents problems in packaging for disposal

UCCNHT0001613

The extent of the contamination in Area 4 which is on L-Tec leased property is unknown at this time. The gamma radiation increases from 200 $\mu\text{R}/\text{hr}$ at the surface to about 600 $\mu\text{R}/\text{hr}$ at a depth of one foot.

To help in the assessment of our problem, ten (10) samples were submitted to EDA Laboratories in Colorado for radium, uranium and thorium analyses. The sample identification and results are reported in the attached Table 1. Before commenting on the analyses, I draw your attention to the State of New York, Department of Labor, Industrial Code Rule 38 that specifies what is required to terminate a license. Section 38 11, 38 29, Table 5 and Table 2 which pertain to this are reproduced and included as Appendix One.

Briefly, to terminate a license the Commissioner of the Department of Labor has to be notified, all radioactive material must be shipped to an approved recipient, the premises must be decontaminated and surveyed to show decontamination took place, and the survey must be verified by the State. Source material (uranium and thorium) must be reduced to 0.05 percent by weight to meet decontamination (This is 500 ppm or 500 $\mu\text{g/g}$). For non-source material for which we are not licensed, the levels are specific for each element e.g. for radium the exempt concentration is 0.1 pico currie per gram.

Returning to Table 1, it can be seen that none of the samples exceed 500 ppm of uranium (results reported in $\mu\text{g/g}$). 500 ppm of Thorium 232 would have an activity of 55 pCi/g (or each pCi represents about 9ppm). Thus it can be seen there are several samples that contain thorium in excess of that required for decontamination. Looking at samples from each of the areas

L-Tec, Samples 40-1, 40-2

The sample taken at one foot depth is out of compliance. We have made no attempt to determine the amount of soil that is contaminated.

Slag Pile East of No 6 Furnace Room, Samples 40-3, 40-4

The Thorium 230 which is in the Uranium 238 decay chain is very high and obviously not in equilibrium with uranium or Radium 226. The Laboratory also found peaks in their analyses that suggest the presence of Thorium 229 (does not occur naturally). This suggests to me that some radioactive material may have been unknowingly introduced into one or more of the vanadium furnace heats and all or part ended up in the slag. This falls into the category of non-licensed material and possibly we need a ruling on it.

Furnace No 30, Samples 40-5, 41-1, 41-2, 41-3

Sample 40-5 is a sample of slag taken from the south of Furnace 30 before we attempted to clean the area. As we suspected it was high in thorium which was present in the pyrochlor ores used in this furnace to make nickel columbium and ferro-columbium.

Sample 41-1 tells us we have more cleanup to do around the north furnace support. This is a difficult job because access to the support is restricted and also because the slag has penetrated between some of the brick supports.

UCCNHT0001615

TABLE 1
RADIOCHEMICAL ANALYSES OF SAMPLES FROM THE NIAGARA PLANT
BY: EDA LABORATORIES - WHEATRIDGE, COLORADO

APRIL 10, 1986

<u>Sample No.</u>	<u>Description</u>	<u>ANALYSES</u>					
		<u>Ra 226</u> <u>pCi/g</u>	<u>Uranium</u> <u>μg/g</u>	<u>232</u> <u>pCi/g</u>	<u>230</u> <u>pCi/g</u>	<u>228</u> <u>pCi/g</u>	<u>Thorium</u> <u>(229)*</u> <u>(pCi/g)</u>
2446-40-1	Surface Sample - L-Tec Property	14±2	34.7	36±3	15±2	38±3	
2446-40-2	Sample for 1' Deep - L-Tec Property	33±3	33.8	74±4	25±2	74±4	
2446-40-3	Dark Slag - East of No. 6 Furnace Building	4.4±1.1	20.2	16±2	299±7	4.0±9	17±2
2446-40-4	Light Slag - East of No. 6 Furnace Building	7.0±1.4	18.6	37±3	466±9	14±2	40±3
2446-40-5	Slag Before Digging - South of No. 30 Furnace	550±10	389	241±7	186±6	241±7	
2446-40-6	Sample from Top of Pit - Building No. 24, V-A1	19±2	28.9	16±2	12±2	17±2	
2446-40-7	Sample from Approximate 5' Depth - Building No. 24, V-A1	31±3	44.3	37±3	22±2	39±3	
2446-41-1	Sample from North Furnace Support - Furnace No. 30 After Cleanup	180±10	122	139±5	76±4	145±5	
2446-41-2	Sample from Ground in Front of Furnace No. 30 After Cleanup	42±3	68.4	35±3	19±2	35±3	
2446-41-3	Sample from Southwest Area of Furnace No. 30 After Cleanup	43±3	24.9	9.6±1.3 8.5±1.3	6.2±1.1 5.9±1.0	9.5±1.3 9.2±1.3**	

*Th229 (not positively identified)

**Duplicate Analyses

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Samples 41-2 and 41-3 indicate the soil to the front and rear of the furnace contains less than 500 ppm combined uranium and thorium and as such meets requirements for uncontrolled access

Pit in Building No 24 (V-A1), Samples 40-6, 40-7

The material removed from the pit in Building 24 analyses less than 500 ppm combined uranium and thorium. However gamma radiation next to a drum will read 150 $\mu\text{R}/\text{hr}$. I believe we will need a ruling on whether we have to dispose of it in an authorized repository or can leave it in the yard. The pit is still not completely clean with radiation of about 50 $\mu\text{R}/\text{hr}$ above the pit and about 150 $\mu\text{R}/\text{hr}$ at the surface 9 feet down. Background is about 9 $\mu\text{R}/\text{hr}$.

I have made the assumption that Radium 226, a decay product of Uranium 238, is at levels consistent with the uranium present and would not be out of line with the 500 ppm source material allowed by New York State. Lee Evans does not agree with me and suspects the state will retreat to the NRC guidelines for unrestricted use. I have mailed Bob Beverly as copy of the New York State Industrial Code Rule 38 for his interpretation.

We are faced with the decision on how to proceed. (1) Umetco could elect not to proceed with license termination but then would be responsible for periodic license renewal, inspections, proof of financial responsibility, etc. and would be unable to sell the property, (2) Umetco could apply to have the license amended so that the area leased to Elkem, hopefully satisfactorily decontaminated, could be excluded from the license, or (3) Umetco could decide to push for license termination. If the third option is selected we will have to better define the problem and spell out the decontamination procedure in far more detail than in my letter of March 25, 1986 to R F Kelly.

Hopefully we can tackle this on your planned visit next week

Sincerely,



D J Hansen

mau/357h
Attachments

UCCNHT0001616

Umetco Minerals Corporation



PO BOX 579 4625 ROYAL AVENUE • NIAGARA FALLS NEW YORK 14302

March 25, 1986

Mr. Robert F Kelly, Senior Radiologist
Occupational Safety & Health
State of New York - Department of Labor
65 Court Street
Buffalo, NY 14202

Subject Termination of Radioactive Materials License 950-0139

Dear Mr. Kelly:

On March 20, when you obtained soil samples to verify the cleanup of the property behind Building 166 on Elkem leased property, I informed you that we had discovered additional areas within the Niagara Plant that had above background radiation. The purpose of this letter is to document our conversation and to make certain that we take the steps necessary for the termination of License No 950-0139.

An environmental audit of the Niagara Plant was scheduled in conjunction with the leverage buy out of Umetco's vanadium and tungsten businesses. In preparation for this, Al Gonias and I completed a gamma survey of the various buildings and grounds on the Niagara site. We found four areas with radiation significantly above background. In addition, the radioactivity of a number of samples stored in quart sized cans was confirmed.

The location of the radioactivity and the levels of radiation observed are shown in Table I.

TABLE I

AREAS IN NIAGARA PLANT SIGNIFICANTLY ABOVE BACKGROUND

<u>Date Surveyed</u>	<u>Location</u>	<u>Background</u>	<u>Maximum Reading</u>	<u>Times Background</u>
2/12/86	Bldg. 29 (#6 Fce Rm) - I-beam south of 30 Fce - Trunion support north of 30 Fce.	5-10 μ R/hr	200 μ R/hr 420 μ R/hr	20 42
2/18/86	Bldg 24 (V-A1) - Area below dust collector	8-13 μ R/hr.	170 μ R/hr	15
2/20/86	Yard East of #6 Fce. Rm - 6' x 6' Areas near slag pile	8-12 μ R/hr	200 μ R/hr	20
2/20/86	Yard East of #6 Fce. Rm - 2' x 2' area near Bldg 191		210 μ R/hr	20

UCCNHT0001617

The surveys were completed with a Ludlum Model 19 Micro R Meter calibrated on September 26, 1984 (Accuracy checked by comparison with an alpha, beta, gamma meter - Nuclear Chicago Model 2650 - March 21, 1986)

The dates the buildings of the Niagara Plant were surveyed and the background radiation observed are contained in Table II More detailed information is contained in Laboratory Notebook 2446

TABLE II

RADIATION SURVEY OF NIAGARA PLANT
Ludlum Model 19 - Micro R Meter

<u>Date</u>	<u>Buildings</u>	<u>Background</u>	<u>Comments</u>
2/12/86	29, 30, 77 (Fce Rm #6)	5-10 μ R/hr	Area next to Fce 30 above background
2/14/86	25, 71, (UCAR, GLOBAR) 32 (#2 Packing)	8-10 μ R/hr 8-10 μ R/hr	Some sample cans >1mR/hr OK
2/14/86	89, 89A (#10 Packing)	8-10 μ R/hr	OK
2/18/86	24, 87 (Vanadium Aluminum)	8-13 μ R/hr	Area below Dust Coll above background
2/20/86	(Storage Shed N W Corner of Umetco Property)	8-12 μ R/hr	OK
2/25/86	7 (Storeroom)	8-10 μ R/hr	OK
2/25/86	6 (Maintenance Office, Electrical & Carpenter Shops)	8-10 μ R/hr	OK
2/25/86	82, 82A (Machine Shop, Sheet Metal)	8-10 μ R/hr	OK
2/27/86	13, 14 (Aux Storeroom, Drum Shop, #8 Packing)	10-12 μ R/hr	OK
3/14/86	111 (Eng Annex-Works Lab)	15-17 μ R/hr	OK
3/14/86	3 (Compressor Bldg)	7-8 μ R/hr	OK

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The plan for decontamination that I reviewed with you was as follows:

1. Remove and store the contaminated material in suitable containers
2. Sample the areas, (either soil or surface wipes depending on which applies) and submit them to a qualified laboratory to identify the sources of the radiation and to confirm the radioactivity has been lowered to acceptable levels.
3. Transport the contaminated material together with the radioactive samples from Building 25 to an approved burial site under the supervision of a qualified broker.
4. Provide the Department of Labor with the analytical results and documentation that the material has been removed from the site and has been accepted for burial.
5. Make arrangements for the Department of Labor to obtain samples to verify that the decontamination was satisfactory

At the time of your visit we had begun to cleanup the area in the vicinity of Furnace No 30 (contaminated slag and soil were being placed into 55-gallon drums) This has been completed and we are now working on cleaning up the area in Building 24

I would like to draw to your attention that the last amendment to License 950-0139 that I have on record is listed as No. 9, dated March 1979, expiration date November 1981 However, I have a copy of a letter dated November 17, 1984 which requests transfer of License 950-0139 from Union Carbide to Umetco Minerals addressed to Mr. George Kasyk of the New York Department of Labor I expect that with our continuing efforts to terminate the license, issuance of the amendments is not a high priority

If you need more information please contact me. If I do not hear from you I will proceed according to the plan outlined above

Very truly yours,



D. J. Hansen

mau/349h

cc: Messrs.
H. K. Jackson
F. V. McMillen
R. L. Miller
D. G. Millenbruch
R. C. Smith
R. G. Tisch
C. T. Wentzel

UCCNHT0001619

APPENDIX ONE

EXCERPTS FROM INDUSTRIAL CODE RULE 38, STATE OF NEW YORK, DEPARTMENT OF LABOR

[38 11]

38 11 Duration of licenses Except as below provided, a license shall expire at the end of the expiration date therein stated. The filing of an application by the licensee more than 30 days prior to the expiration date for a renewal or a new and superseding license shall extend the license until the commissioner has finally acted on the application. If a licensee fails to renew his license, he must immediately cease all use of radioactive materials, transfer all radioactive material to authorized recipient(s) and comply with the requirements of Section 38 29 of this Part (rule). To terminate a license, licensee must notify commissioner, transfer all radioactive materials to authorized recipient(s) and comply with the provisions of Section 38 29 of this Part (rule).

38 12 Renewal of licenses An application for a renewal of a license shall be made on a form prescribed by the commissioner. Renewal of a license may be denied on any of the grounds specified in this Part (rule) for the issuance of licenses or for the suspension or revocation of licenses. Notwithstanding the renewal of a license, the commissioner may suspend or revoke a license for cause or violations occurring during the license period immediately preceding the issuance of the renewal.

38 13 Amendment of licenses A corrective amendment of a license may be made by the commissioner at any time upon his initiative or at the request of the licensee. Upon the licensee's written request the commissioner may amend a license in any respect consistent with this Part (rule). Every license may be amended by the commissioner upon any ground for which he might deny, suspend or revoke such license.

38 14 Suspension or revocation The Commissioner may revoke or suspend any license, or approval, in whole or in part, for:

- (a) Any material misstatement in the application therefor or in any supplementary statement thereto,
- (b) Any condition revealed by such application, supplementary statement, report, record, inspection or other means which would warrant the commissioner to refuse to grant a license or approval on an original application, or
- (c) Any violation or failure to observe any of the applicable terms or provisions of a license, an approval, the Labor Law, this Part (rule) or any other applicable law, rule, regulation, code or order.

38 15 Additional requirements Notwithstanding any exemption set forth in this Part (rule), the commissioner may by order, as part of a license or otherwise, make such specific requirements, in addition to those set forth in this Part (rule), as may be reasonably appropriate.

timers shall be maintained in good repair and proper operating condition and shall be checked at least every six months or at such intervals as may be required by the commissioner

38 27 Enclosed controlled areas Any enclosed controlled area with any access opening large enough for the passage of any person shall have such opening provided with an exit door which can be opened manually from the inside or by such other means approved by the commissioner

38 28 Eating, drinking or smoking No person shall permit eating, drinking or smoking in any airborne radioactivity area or in any controlled area with surface contamination above the limits specified in Table 5 of this Part (rule)

38 29 Vacating installations and property (a) *Installations* Each licensee before vacating any installation, or transferring the premises containing such installation, shall permanently decontaminate such installation and premises below or equal to the limits specified in Table 5 of this Part (rule). A survey shall be made after such decontamination and the commissioner and landlord or subsequent tenant or transferee shall be provided with a copy of such survey. No such installation or premises shall be vacated, sold or transferred until the decontamination survey has been verified and accepted by the commissioner.

(b) *Property* No machinery, instruments, laboratory equipment or any other property used in contact with or in close proximity to radioactive material in a licensed installation shall be assigned, sold, leased or transferred to an unlicensed person unless such property has been permanently decontaminated below or equal to the limits specified in Table 5 of this Part (rule). A survey shall be made after such decontamination and the commissioner and subsequent transferee or owner shall be provided with a copy of such survey. No such property shall be assigned, sold, leased or transferred until such decontamination survey has been verified and accepted by the commissioner.

38 30 Personnel monitoring equipment Every person who possesses a radiation source shall apply appropriate calibrated and operable personnel monitoring equipment to, and in case of film badge and thermoluminescent dosimeters which are processed by a laboratory or firm which is currently accredited by the United States National Bureau Standards under their National Voluntary Laboratory Accreditation Program, and shall require the use of such equipment by, each individual whom such person suffers or permits to enter

TABLE 5
LIMITS FOR UNCONTROLLED AREAS

(a) Surface contamination limits

(1) Alpha emitters

(i) Removable

$$\frac{15 \text{ pCi}}{100 \text{ cm}^2} = \frac{33 \text{ dpm}}{100 \text{ cm}^2} \text{ average over any one surface}$$

$$\frac{45 \text{ pCi}}{100 \text{ cm}^2} = \frac{100 \text{ dpm}}{100 \text{ cm}^2} \text{ maximum}$$

(ii) Total (fixed)

$$\frac{450 \text{ pCi}}{100 \text{ cm}^2} = \frac{1000 \text{ dpm}}{100 \text{ cm}^2} \text{ average over any one surface}$$

$$\frac{2250 \text{ pCi}}{100 \text{ cm}^2} = \frac{5000 \text{ dpm}}{100 \text{ cm}^2} \text{ maximum}$$

$$0.25 \text{ mrem at } 1 \text{ cm}$$

hr

(2) Beta-Gamma emitters

(i) Removable
(all beta-gamma emitters except

$$\frac{100 \text{ pCi}}{100 \text{ cm}^2} \text{ average over any one surface}$$

Hydrogen 3)

$$\frac{500 \text{ pCi}}{100 \text{ cm}^2} \text{ maximum}$$

Removable

$$\frac{1000 \text{ pCi}}{100 \text{ cm}^2} \text{ average over any one surface}$$

(Hydrogen 3)

$$\frac{5000 \text{ pCi}}{100 \text{ cm}^2} \text{ maximum}$$

(ii) Total (fixed)

$$0 \text{ surface}$$

(b) Concentrations in air and water Table 6, Schedule II

(c) Concentrations in soil and other materials except water

(1) Radioactive material except source material Table 2 Column 2

(2) Source material 0.05 per cent by weight

Note Jurisdictional limits. The limits listed in Table 5 of this Part (rule) shall apply to those installations and property that remain subject to the jurisdiction of the Labor Law and this Part (rule)

TABLE 2
EXEMPT CONCENTRATIONS

<i>Element (atomic number)</i>	<i>Isotope</i>	<i>Column 1</i> <i>Gas con-</i> <i>centration</i> $\mu\text{Ci/ml}^*$	<i>Column 2</i> <i>Liquid and</i> <i>solid con-</i> <i>centration</i> $\mu\text{Ci/ml}^{**}$
Antimony (51)	Sb 122		3×10^{-4}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
	Cd 115		9×10^{-5}
Calcium (20)	Ca 45		5×10^{-4}
	Ca 47		8×10^{-3}
Carbon (6)	C 14	1×10^{-6}	9×10^{-4}
Cerium (58)	Ce 141		4×10^{-4}
	Ce 143		1×10^{-4}
	Ce 144		2×10^{-2}
	Cs 131		6×10^{-2}
Cesium (55)	Cs 134m		9×10^{-5}
	Cs 134		2×10^{-4}
	Cs 137		4×10^{-3}
	Cs 138	9×10^{-7}	2×10^{-2}
Chlorine (17)	Cl 38		5×10^{-3}
Chromium (24)	Cr 51		1×10^{-3}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		5×10^{-4}
	Co 60		3×10^{-3}
	Cu 64		4×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-4}
	Dy 166		9×10^{-4}
Erbium (68)	Er 169		1×10^{-3}
	Er 171		

See notes at end of table

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

<i>Element (atomic number)</i>	<i>Isotope</i>	<i>Column 1</i> <i>Gas con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^*$	<i>Column 2</i> <i>Liquid and</i> <i>solid con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^{**}$
Europium (63)	Eu 152 (T $\frac{1}{2} = 9.2$ Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Indium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}

See notes at end of table

TABLE 2—(Continued)
EXEMPI CONCENTRATIONS

<i>Element (atomic number)</i>	<i>Isotope</i>	<i>Column 1</i> <i>Gas con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^*$	<i>Column 2</i> <i>Liquid and</i> <i>solid con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^{**}$
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium)(41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (32)	P 32		2×10^{-4}
Platinum (78)	Pt 191		1×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Polonium (84)	Po 210	2×10^{-10}	7×10^{-6}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-4}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Radium (88)	Ra 226	1×10^{-11}	1×10^{-7}
	Ra 228	2×10^{-11}	3×10^{-7}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}

See notes at end of table

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

<i>Element (atomic number)</i>	<i>Isotope</i>	<i>Column 1</i> <i>Gas con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^*$	<i>Column 2</i> <i>Liquid and</i> <i>solid con-</i> <i>centration</i> $\mu\text{Ci}/\text{ml}^{**}$
Scandium (21)	Sc 46	9×10^{-8}	4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
Terbium (65)	Te 132		3×10^{-4}
	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-1}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-1}
	Tm 170		5×10^{-4}
Thulium (69)	Tm 171		5×10^{-3}
	Tm 173		
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	

See notes at end of table

TABLE 2—(Continued)
EXEMPT CONCENTRATIONS

Element (atomic number)	Isotope	Column 1	Column 2
		Gas concentration μCi/ml*	Liquid and solid concentration μCi/ml**
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Ar 97		2×10^{-4}
Alpha-emitting radioactive material other than special nuclear and transuranic material not listed above		1×10^{-12}	1×10^{-6}
Beta and/or gamma-emitting radioactive material not listed above with half-life less than 3 years		1×10^{-10}	1×10^{-6}

NOTES

* Values are given for those materials normally used as gases

** μc/g n for solids

Note 1 Many radionuclides disintegrate into daughter products which are also radioactive. In expressing the concentrations in Table 2 the activity stated is that of the parent radionuclide and takes into account the daughter products.

Note 2 For the purposes of section 38.41 Table 1, Exemption 2 of this Part (rule) where there is present a combination of radionuclides the limit for the combination shall be derived as follows

(a) Determine for each radionuclide present the following quotient. Set the numerator equal to the concentration of the radionuclide present and the denominator equal to the exempt concentration listed in Table 2. The sum of such quotients shall not exceed "one".

Example

$$\frac{\text{Concentration of Radionuclide A present}}{\text{Exempt concentration of Radionuclide A}} + \frac{\text{Concentration of Radionuclide B present}}{\text{Exempt concentration of Radionuclide B}} < 1$$

27/16 187

UCCNHT0001628

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JOB NO	TITLE	PAGE NUMBERS
	Radiation Survey of Niagara Plant	p12-23, p32-35 p36-37
	Radiation Survey York Navy Plant	p41-47,
	Samples taken for Radon assays from Plant + Slag Piles	p26-41
	Soil Sampling of yard Area	p42-45
	OTHER	
	Cl ₂ in YOCl ₃ - 2 Methods Freezing- Boiling	
	Uladag Ore	
	Fluoride Survey Del - Venezuela	

CONTENTS

UCCNHT0001630

CONTENTS

INSTRUCTIONS FOR USE OF DATA BOOK

- 1 ENTER JOB NUMBER AND TITLE AT TOP OF PAGE**
- 2 FOR EACH EXPERIMENT, STATE OBJECT, EQUIPMENT USED**
- 3 RECORD ALL NECESSARY DATA**
- 4 DISCUSS RESULTS OF TEST, PRODUCT OBTAINED, ETC**
- 5 ENTER DATE OF THE DAY DURING WHICH WORK WAS DONE**
- 6 SIGN EACH PAGE**
- 7 DO NOT ERASE-CROSS OUT DO NOT REMOVE PAGES FROM BOOK**
- 8 DO NOT LEAVE UNUSED AREAS AT TOP OF PAGE CROSS HATCH
UNUSED AREAS AT BOTTOM OF PAGE**
- 9 TABLES REQUIRING MANY COLUMNS MAY BE CONTINUED OVER
SEVERAL PAGES BUT FILL IN HEADINGS, SIGN, AND DATE
EACH PAGE**

SUBJECT Gladay W One - OR 711

July 9, 1984

JOB NO 711
OR 711 (XRD on feed sample) Head Analysis 0.30.0.0 WO.3Mill Feed Sample 14m x DWet Screened:Feed wt = 1003.7 gm

NO	SIZE	WT	WT O ₃	WT O ₁₀	WT W DIST
2446-1-1	- 14m x 4.8m	733.5 gm	0.35*	717.67	39.9%
- 1-2	- 4.8m x 100m	195.4 gm	0.293*	19.66	20.40
- 1-3	- 100m x 200m	126.1 gm	0.303*	12.69	14.09
- 1-4	- 200m x D	238.7 gm	0.39	24.02	25.53
		993.7	0.27		

Heavy liquid separation C sp.gr 3.3 on above screen fractions:

Sample No	Description	WT gm	WT O ₁₀	WT W O ₃	WT O ₃ DIST
2446-1-1F	14x4.8m, Flat	681.70	299.5	69.17	0.040
- 1-1S	.., sink	133.8	30.88	0.71	88.94
				0.25	
- 1-2F	4.8x100m, Flat	68.79	69.36	0.028	5.646
- 1-2S	.., sink	30.39	30.64	0.87	94.354
				0.283	
- 1-3F	100x200m, Flat	67.4	71.78	0.021	4.976
- 1-3S	.., sink	26.5	28.77	1.02	95.024
				0.303	

Magnetic separation on 100x200m, sink (feed wt = 23.2 gm - 3.3 gm for analysis)

NO	FRACTION	WT gm	WT O ₁₀	WT W O ₃	WT O ₃ DIST
2446-1-3S-1	Hand mag.	40.5	17.56	0.41	7.03
{ - 1-3S-2	mag @ 0.2a	0.13	1.561	0.21	3.20
{ - 1-3S-3	mag @ 0.4a	3.47	2.83		
- 1-3S-4	mag @ 0.6a	10.30	44.67	0.094	4.10

Continued on page 7* calculated from subfractionsRECORDED BY C. J. BartholomewDATE 7/16/84

WITNESSED AND UNDERSTOOD BY

DATE

2

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Mladay Wore - OR 714

July 9, 1984

JOB NO. _____

1 XRD lead sample

RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Molybdenum - OR 715July 9, 1984

JOB NO _____

XRD on ~~As~~ sample1
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RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

UCCNHT0001635

4

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Wladay w One - OR 716

July 9, 1984

JOB NO _____

1 XRD on lead sample

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RECORDED BY _____

DATE _____

WITNESSED AND UNDERSTOOD BY _____

DATE _____

UCCNHT0001636

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Welding OneJuly 11, 1984Composite OR 716 + OR 715 C.I.C. Head Anal/S10 = 0.700% WO₃

Blended equal splits (by wt) of OR 715 and OR 716 for mineralogy tests

Wet screening:

Sample No	Size (mesh)	wt-gm	WT %	WT % WO ₃	WT % W-Dust	Line No
2446-5-1	14x48	480.5	49.29	0.551*	36.94	5
-2	48x100	197.9	19.99	1.186*	32.75	6
-3	100x200	113.0	11.35	0.679*	10.70	7
-4	200x0	203.7	20.47	0.69	19.61	8
		995.1		0.72		9
						10

* calculated from subfractions

Heavy liquid separation C sp.gr = 3.3

No	FRACTION	wt-gm	WT %	WT % WO ₃	WT % W-Dust	Line No
2446-5-2F	17x48, float	262.9	54.79	0.18	17.9%	14
5-2S	48x100, S, NK	916.9	175.31	1.00	92.09	15
				.551		16
992-5-2F	48x100M, FLOAT	53.45	53.40	0.080	3.64	17
-5-2S	48x100M, S, NK	45.71	46.10	2.45	96.36	18
				1.186		19
-5-3F	100x200M, FLOAT	59.8	53.11	0.042	3.29	20
-5-3S	100x200M, S, NK	52.8gm	46.89	0.40	96.71	21
				0.679		22

continued on next page

RECORDED BY

C J Bartlomei

DATE

7/10/84

WITNESSED AND UNDERSTOOD BY

DATE

UCCNHT0001637

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Magnetic Separation on Wadag Ore

OR 715+716

JOB NO _____

1 Continued from page 5:

2
3 Magnetic separation 2446-5-3S (100x200m, sink)

5	Sample No.	Fraction	WT-gm	WT.-%	% W _O ₃	%) W-DIST
6	2446-5-3S-1	Hand-mag.	10.70	23.25	0.34	5.62
7	-2	mag @ 0.3amps	1.90	4.13	1.21	3.55
8	-3	mag @ 0.5amps	16.72	35.69	0.32	8.12
9	-4	mag @ 0.8amps	2.82	6.13	1.09	4.75
10	-5	{ mag @ 1.2amps 1.10 } 1.072	1.56		4.49	2.63
11	-6	{ mag @ 1.6amps 0.38 }	0.38	0.82		2.33
12	-7	non-mag @ 1.6amps	13.08	28.42	3.48	20.33
13					1.40	
14					1.41	
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RECORDED BY _____

DATE _____

WITNESSED AND UNDERSTOOD BY _____

DATE _____

SUBJECT 91 Rulay One - OR711

JOB NO _____

Continued from page 1

Mag separations:

No

FRACTION - wt

wt%

%WO₃

wt

W Dist

2446-1-3S-5 - Smag @ 1.1a 0.56g/

-6 (mag @ 1.7a 0.26g/)

combined - 5cf - 6

-7 Non Mag @ 4.29g -

3.56

1.99

6.90

18.60

4.34

78.77

1.03

1

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RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

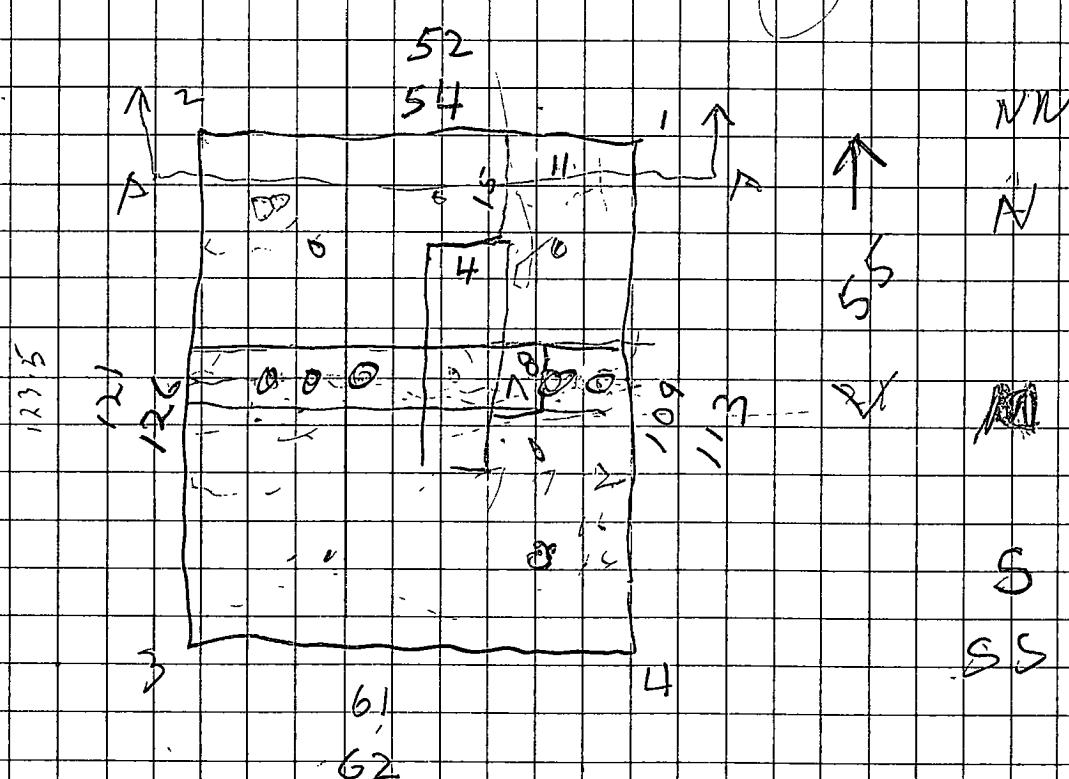
SUBJECT VENTURI SCRUBBER
CAKE

JOB NO _____

1 PILE DIMENSIONS

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Nov 12/85



$$A = 6$$

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RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

9

SUBJECT

Nov 13/83

JOB NO

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Height of P17

1 to 4

10 - 6"

20 - 2'

30 - 2.5'

40 - 2'

50 - 3'

60 - 3'

70 - 2'

80 - 3'

90 - 2'

100 - 1.1'

109 -

0

Av 1.6

Sub 2.0'

@ 10 pages

3 to 2

10 - 2.5'

20 - 3.5'

30 - 3.5'

40 - 4.5'

50 - 4.5'

60 - 4.5'

70 - 5.5'

80 - 5.5'

90 - 4.5'

100 - 4.1'

110 - 3.5'

120 - 2.5'

130 - 1.1'

3.6

Say 4.0

Av = 3' in depth

RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

UCCNHT0001641

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT _____

JOB NO

Nov 13BULK DENSITY OF STOCK PINE

Wt of Beaker 1003.8

Wt of Sample 115.8 115.8

Wt after Submerged 1168.5

Vol of Sample 1000 ml 110

pH - by meter 3.2
by paper 3

pH of Pile on Top 4.4

After Wt 1169 After Birds-Spoon Grav. 1.15 g/cc
Before Wt 1158

Gain 11g

RECORDED BY

DATE

WITNESSED AND UNDERSTOOD BY

DATE

UCCNHT0001643

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT Radiation Survey of Niagara Plant 2/12/86

No 6 Furnace Rm

JOB NO 523-203011 (Bldg 24 - 30 - 77) ^{8/1}
2 _{3/26}

3 A radiological survey of Furnace Rm No 6

4 of the Niagara Plant was performed by

5 A. Jonas & D Hansen during the

6 afternoon of Feb 12, 1986. The

7 survey consisted of a - scan of

8 floor areas, lower wall surfaces, and contumers

9 located on both the main floor and the deck.

10 Portable instrumentation used in

11 the survey include a Ludlum Model 19, and Micro R Meter

12 and a Thyscal III (Victoreen) meter with

13 a 489-35 alpha-beta-gamma GM Probe

14 Background was between 5 to 10 $\mu\text{R}/\text{hr}$.

15 In the foreman's office (enclosed by brick walls) the

16 background was 20 $\mu\text{R}/\text{hr}$.

RECORDED BY:

WITNESSED AND UNDERSTOOD BY:

D Hansen
O M Jones

DATE 2/13/86

DATE 2/13/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Cont2/12/86

JOB NO

Drums containing V_2O_5 (UCC not Finalized) .
 1
 2
 3

showed a level of $50 \mu R/hr$. The
 4
 some reading was observed ~~on~~^{on the surface of} drums
 5
 6
 7
 smashed ferro vanadium on the West wall.
 8
 9

The highest reading was observed
 10
 at the base of an "I" beam located
 11
 to the south of No 30 Fc. The
 12
 reading was $200 \mu R/hr$.
 13
 14
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 17

Nothing above $30 \mu R/hr$ was observed
 18
 19
 on the deck.
 20
 21
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RECORDED BY

J. J. Hansen

DATE

2/13/86

WITNESSED AND UNDERSTOOD BY

O. M. Jones

DATE

2/13/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey Cont

Feb 14/86

AM

No 2 PACKING - Glowbar Area

JOB NO

1		
2	Background S ENTRANCE	8-10 $\mu\text{R}/\text{hr}$
3		
4	Sample Cage - Background	28-30 $\mu\text{R}/\text{hr}$
5		
6	Cabinet - 428 ft (W's wheel 4 ft)	280 $\mu\text{R}/\text{hr}$ (Can 12904)
7		800 $\mu\text{R}/\text{hr}$ (Can 12599)
8	Sec 117 Can 13231	1100 $\mu\text{R}/\text{hr}$
9		
10	Can on top of N shelf	4500 $\mu\text{R}/\text{hr}$
11		
12	East Wall S to N	
13		
14	Boyle Hex containing Sample to be disposed of	8.0 to 120 $\mu\text{R}/\text{hr}$
15		
16	Air 8.0	
17		
18	West Wall N to S	
19		
20	OK	
21	Center Area OK	
22		
23	Blender Rm	
24		8-10 μR Background
25		
26	Ground Floor No 2 PACKERS	
27	E wall S to N	OK
28		
29	Crushit Rm	OK
30	Sample Prep Rm	OK
RECORDED BY	J. Hansen	DATE 2/14/86
WITNESSED AND UNDERSTOOD BY	G. M. D. Gandy	DATE 2/17/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey ContFeb 14 / 86JOB NO 523-20301No 10 PACKING

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S End E wall Background $0-10 \mu\text{R}/\text{hr}$ at S ENTRANCE

Deck on East Wall S Tally OK on East Wall
N to S OK on West Edge

Gronna F1002.

S End E Wall To N
Second E wall $25 \mu\text{R}/\text{hr}$ OK

W. End To S West OK
V.L.S P. S. $32 \mu\text{R}/\text{hr}$
" $15 \mu\text{R}/\text{hr}$

Slightly above background against
walls $15 \mu\text{R}/\text{hr}$

RECORDED BY

D. J. Hansen

DATE

2/14/86

WITNESSED AND UNDERSTOOD BY

C. M. Gross

DATE

2/14/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Pesticides Survey Cont.2/18/86JOB NO 523-20301

1 A radiological survey of Dept 146 - Vanadium
 2 dimensions was done by A. Goras, Tuesday
 3 Feb. 18, 1986, 1 to 2:30 P.M.
 4

5 After establishing a background radiation level of
 6 8-13 micro R/hr. just outside the department
 7 door, a survey was performed of the mellen
 8 Dept. and storage area.
 9

10 Only one area indicated any large increase
 11 over background level. This was in a
 12 very heavy layer of glaze on the west side,
 13 suspended plaster of the building.
 14

15 One employee said the area was the old
 16 C2F that was dismantled years ago.
 17

18 The readings were 100 to 130 micro R/hr. over a
 19 large area of dust.
 20

21

22

23

24

25

26

27

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30



RECORDED BY

AM Jones

DATE

2/18/86

WITNESSED AND UNDERSTOOD BY

Diferman

DATE

2/18/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey Cont2/20/86

Outside of Fce #6

JOB NO 523 - 20301

In this case due to mud and deep water in the area East of #6 Furnace Km to the property boundary only a rough survey could be made, using the Ludlum Model 19 micro R/hr meter suspended on a rope to approximately 3 to 6" above the ground. Three walking passes were made on this area, not in straight lines due to obstructions. Only one area gave readings high enough to be noted. 0.90 to 0.15 mR/hr. This area is a pile of large pieces of furnace slag located in a straight line East of 6 furnace between Stock 2 and 3 of the building. Back ground measures 8-12 micro R/hr.

Another small area had a reading of 0.30 mR/hr. This area is located west of a single tank and on the east side of a line of slag dividing the property from Ellicott. This material is portable on Ellicott perfectly.

Also rechecked was the down in Blk #14³ where the railings were left - No reading above background. area observed. Back ground here is 0.8 - 1.3 micro R/hr.

The fiberglass storage shed on the northwest corner of the Vanneto property was also surveyed. Nothing above background was observed. Background here is 8-12 micro R/hr. Surveying the field south of the parking lot in one pass North to South, no reading above background were observed.

RECORDED BY

O M McDonald

DATE

2/21/86

WITNESSED AND UNDERSTOOD BY

Donald J. Hansen

DATE

2/21/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey Cont.2/25/86JOB NO 523-20301

1 Using a Ludlum - Model 19 Micro R/hr meter
 2 A recheck of two areas noted previously was done
 3 to confirm the result.

4 FT 6 furnace Room

5 The area around FT 30 furnace was again surveyed
 6 The background was measured at $5\frac{1}{2}$ mics R/hr

7 The base area around the 6th support I-beam column
 8 from the south end of the building was rechecked
 9 at 50 to 170 mics R/hr.

10 Also at the base of the furnace pier or tilt
 11 mechanism, north side, a reading of 420 mics R/hr
 12 was measured

13 Also the area in the Varnish-Al building -
 14 was rechecked - The reading of 50 to 170 mics R/hr
 15 was confirmed to be higher than originally observed in
 16 the dusty area where a furnace was many years ago.
 17 This area is on the north west abandoned area of the bldg.

RECORDED BY

A. M. HansenDATE 2/26/86

WITNESSED AND UNDERSTOOD BY

Donald J. HansenDATE 2/26/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey Cont.2/26/86JOB NO 523-20301

Radiation Survey was done by Dr. D.J. Hansen and
 A.M. Goros? Surveyed was the store room and maintenance buildings.

Store room Survey - Ground floor

Background - 8-10 micro R/hour

O.K. - No high readings were noted.

- Basement

Background - 8-10 micro R/hour

O.K.

- Top Floor

Background - 8-10 micro R/hour

O.K.

Electrical Shop. - Top floor

Background - 8-10 micro R/hour

Office

Storage Room North } O.K. no abnormal high readings

" " South }

Sample Room }

Machin. Shop - Top floor.

Background - 8-10 micro R/hour

Brick on south wall - 18 micro R/hour

Brick block on East wall - 13 micro R/hour

O.K. - Remainder of machine is good - no high readings.

Cut pg 20

RECORDED BY

A. M. Goros

DATE

2/26/86

WITNESSED AND UNDERSTOOD BY

Dorothy Hansen

DATE

3/20/86

METALS DIVISION

UNION CARBIDE CORPORATION, NIAGARA FALLS, NEW YORK

SUBJECT

Radiation Survey Cont.

2/25/86

JOB NO 523-20311

- 1 Machine Shop - Ground floor - East side of building
 2 Background - 8-10 micro R/hr.
 3 East Side O.K. - No reading much above background
 4 were noted
 5 Only one on the brick walls were the
 6 readings 3-5 micro R/hr. high.
 7
 8 Survey was North to South on the East side
 9 South to North on the Center area
 10
 11 West side
 12 Background - 8-10 micro R/hr.
 13 Survey was North to South then center
 14 Under stairs at south end of building
 15 25 micro R/hr. next to bricks
 16
 17 Lumber doors O.K.
 18
 19 Bricks on west wall - 10 micro R/hr.
 20
 21 Carpenter Shop - Background - 8-10 micro R/hr.
 22
 23 O.K. - No high reading observed
 24
 25
 26
 27
 28
 29
 30 Donald J. Farmer

RECORDED BY

DATE

2/26/86

WITNESSED AND UNDERSTOOD BY

DATE

2/26/86